

Constrictive Pericarditis Due to Pulmonary Tuberculosis

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Abstract. **Background.** Pericardium disease can occur due to abnormalities of the pericardium itself or as a result of systemic disease. One of the diseases that can occur in the pericardium is the constrictive pericarditis characterized by visceral and parietal pericardium layer attachment. Tuberculosis (TB) is a major cause of constrictive pericarditis in developing countries. **Case report.** A 21-year-old complaints were pain like being stabbed on the left chest, easily tired, swollen legs, cough and weight loss. Chest X-ray examination were cardiomegaly and infiltrates. Echocardiography examination found pericardium effusion, constrictive pericarditis with decreased function of cytolitic and diastolic left ventricle. Mantoux Text showed positive results. The treatments were antibiotics, diuretics, antituberculous drugs and steroids. **Discussion.** Constrictive pericarditis is a chronic process of pericardium fibrous thickening that inhibits diastolic filling of the heart, decreases venous return and decreases cardiac output. The diagnosis of constrictive pericarditis is based on the association between clinical manifestation and from the results of one or more imaging studies. Medical therapy has a role in the treatment of specific causes, anti-inflammatory, and supportive effects. **Conclusion.** We reported a case of constrictive pericarditis due to pulmonary TB.

1 INTRODUCTION

The pericardium has several important functions such as restricting the stretch or distention of the cardiac cavity and facilitating the interaction of the ventricles and the atrium so that changes in pressure and volume in one part of the heart can affect pressure and volume in other parts of the heart. Pericardium also serves as a barrier to the spread of infection and friction from the tissues surrounding the heart. Although the pericardium has many important functions but on the condition that the pericardium is not found it is reported to have no significant adverse effects (Francis, 2011).

Pericardium disease can occur due to abnormalities of the pericardium itself or as a result of systemic disease. Some diseases that can occur in the pericardium such as pericarditis (acute, subacute, chronic and recurrent), pericardium effusion, cardiac tamponade and constrictive pericarditis (Adler, 2015).

Constrictive pericarditis is characterized by diastolic cardiac filling disorder and increased ventricular filling pressure due to rigid pericardium with visceral and parietal pericardial layer attachment. The symptoms of constrictive

pericarditis are the symptoms of heart failure with increased jugular venous pressure, shortness of breath, peripheral oedem, hepatomegaly, and ascites. Tuberculosis is a major cause of constrictive pericarditis in developing countries where the incidence of tuberculosis is still high, but the incidence in the developed countries is still rare (Adler, 2015), (Dal-Bianco, 2009), (Lewinter, 2012).

2 CASE REPORT

A 21-year-old man went to the heart center emergency department on August 2016 with a main complaint of chest pain. Chest pain was felt by the patient since 5 days, felt like being stabbed on the left chest without spreading, nausea, vomiting or cold sweat. Pain was felt to be more severe if the patient inhales. Patients also complain of fatigue easily during the activity within 2 weeks. Swollen legs were found within 3 days. Cough has been found since 6 months with white sputum without blood. Patients admitted weight loss in the last 6 months as much as 10 kg with decreased appetite. Fever, history of fever, history of shortness of

breath, hypertension, diabetes mellitus, smoking, and drinking alcohol were denied by the patient.

On physical examination, sensorium alert, blood pressure 100/70 mmHg, pulse 144 times/minute, regular, pressure and volume enough, respiratory rate 28 times/minute, body temperature 36.7 ° C. Pale conjunctiva and icteric sclera was not found. Increase of jugular vein pressure was found, kussmaul sign (+). Heart sound S1 and S2 was normal, murmur (-), gallop sound (-). Lung: vesicular respiratory sound, rales or wheezing was not found. Abdomen: soepel. Liver, lien, renal were not palpable, peristaltic (+) normal. Extrimities: warm acral, oedem pretibial was found on both legs.

From laboratory test: Hb: 12,4 g^o%; Ht 39%; Leucosytes 13.220/mm³; PLT 328.000/mm³; Ur: 17 mg/dL; Cr 0.59mg/dL; Na 138 mEq/L; K 3.5 mEq/L; Cl 107 mEq/dL; Albumin 2.7 g/dL; Blood Glucose adr 161 mg/dL, ASTO <200; CRP 0.7 mg/dL. The patient had done electrocardiographic (ECG) and Chest X-Ray examination (Figure 1), the conclusions from echocardiography examination and Doppler Tissue Imaging were pericardiac effusion and constrictive pericarditis (Figure 2 and Figure 3).

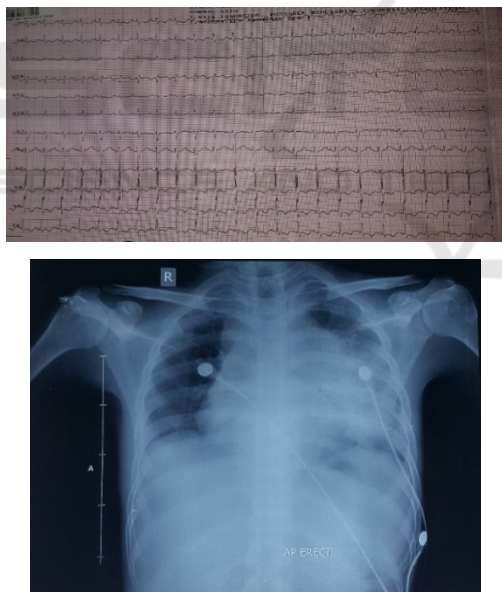


Figure 1: The ECG and Chest X-Ray of the Patient. The impressions of (ECG) examination were sinus tachycardia and LVH. Cardiomegaly and infiltrates were found on Chest X-Ray examination.

The patient was diagnosed with constrictive pericarditis, mild pericardiac effusion due to suspect pulmonary tuberculosis and was consulted to the pulmonologist. Interpretation of mantoux test was 27mm induration, redness (+), itchy (+), conclusion:

a positive result. Sputum culture results: Direct smear of tuberculosis I and II was negative.

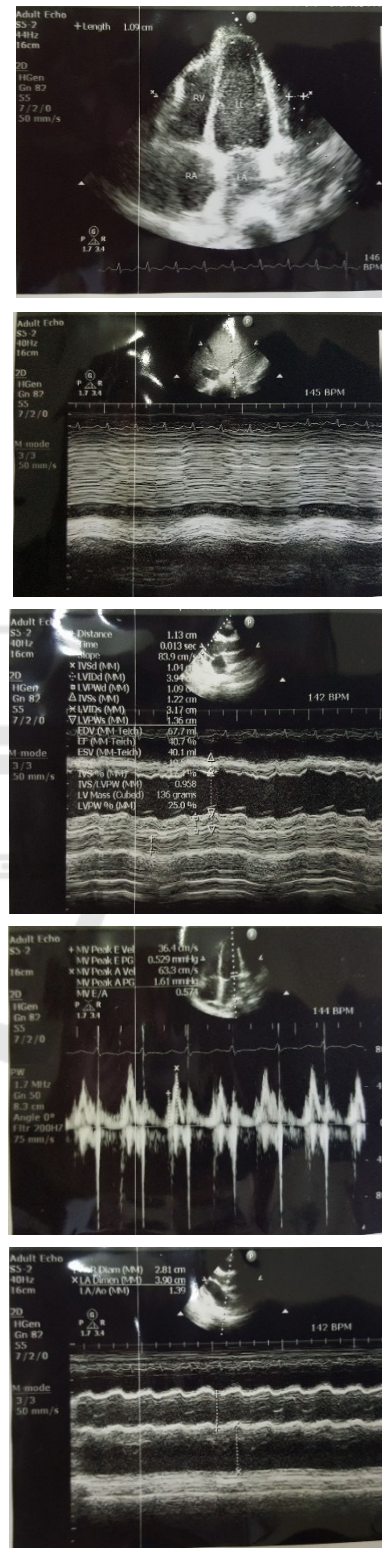


Figure 2: The Echocardiography Results of the Patient.

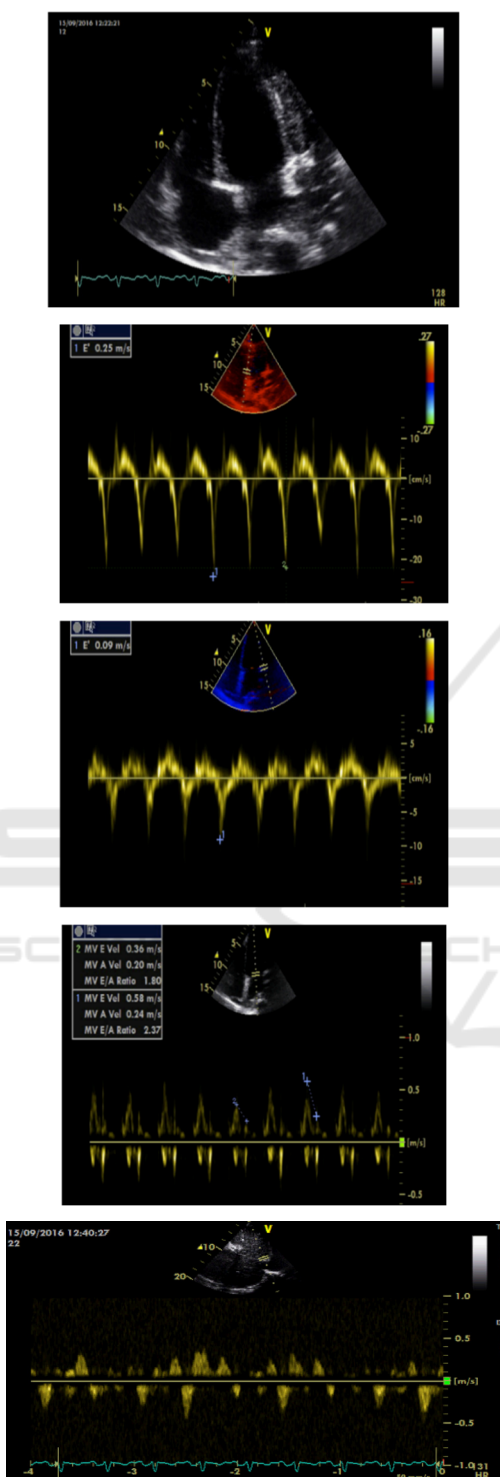


Figure 3: Doppler Tissue Imaging of the Patient. The e' medial velocity was 25 cm/s and the e' lateral velocity was lower (9 cm/s). There was an increase in the difference of mitral flow rate during inspiration and expiration > 25%. There was also an increase in backflow of diastolic hepatic veins at expiration.

Treatments of this patient were bed rest, O2 2-4 L/min with nasal canule, IVFD NaCl 0,9% 10 gtt/min, Cefotaxime 1 gr/8 hours/i.v, Gentamicin 120 mg/12 hours/i.v, anti-tuberculosis first category drugs (Fixed Dose Combination) 1x3 tab, prednisone 3x20 mg/oral, furosemide 1x40 mg/oral, paracetamol 3x500 mg/oral, vitamine B6 1x2 tab. There was clinical improvement after treatment for 14 days and the patient can get outpatient control.

Heart spaces and large blood vessels in the normal position. Heart valves are good. There is no defect in the heart chambers. There is a thickening of the pericardium parietal and visceral with adhesion of the pericardium in some places. There is a light pericardium effuse. The systolic and diastolic function of LV decreases.

3 DISCUSSION

Constrictive pericarditis is a chronic process of pericardium fibrous thickening which is often followed by calcification and inhibition of diastolic filling of the heart, decreasing venous return and decreasing cardiac output. Constrictive pericarditis is caused by a chronic inflammatory process of the pericardium that triggers scar formation, fibrosis and calcification in the pericardium. The incidence rate of tuberculosis pericarditis is < 4% of pericardium disease cases in developed countries but far different when compared with developing countries that is 50-70% of cases without HIV disease and > 90% in cases accompanied by HIV disease, especially in endemic areas for tuberculosis. In developed countries the most frequent causes are idiopathic, postoperative, radiation effects. In developing countries, tuberculosis is the leading cause of constrictive pericarditis (Adler, 2015; Lewinter, 2012; Little, 2006). In this case, the patient is diagnosed with pulmonary tuberculosis where tuberculosis is the most common cause of constrictive pericarditis in developing countries including Indonesia.

Constrictive pericarditis is characterized by diastolic ventricular filling disorder resulting from pericardium disease. Typical clinical features are signs and symptoms of right heart failure with good left and right ventricular function without any myocardial or other ballast disease. Patients complaint of fatigue, peripheral edema, shortness of breath and ascites. Venous congestion, pleural effusion, hepatomegaly may also occur (Adler, 2015; Mayosi, 2005).

On physical examination we can find an increase in jugular venous pressure. Kusmmaul sign, ie

increased venous pressure during inspiration or no decrease in venous pressure during inspiration, can also be encountered. Pulsus paradoxus occurs in a third of cases, especially in pericarditis patients followed by pericardium effusions. Another typical sign that can be encountered is the pericardial knock that arises during the initial diastolic phase due to the sudden cessation of ventricular filling. On abdominal examination we can find hepatomegaly and liver congestion symptoms such as ascites and jaundice. Oedem in both lower extremities is the most common in cases of constrictive pericarditis (Lewinter, 2012), (Talreja, 2008).

In this patient, the main complaints were chest pain, fatigue, cough, and weight loss. The results of physical examination were tachycardia, increase in jugular venous pressure, kussmaul sign and pretibial oedem on both legs.

The diagnosis of constrictive pericarditis is based on the association between signs and symptoms of right heart failure with diastolic filling disturbance resulting from constriction in the pericardium from the results of one or more imaging studies, including echocardiography, CT, CMR and cardiac catheterization (Adler, 2015), (Liu, 2009).

Low QRS voltage, nonspecific T-wave changes and P mitral are common but ECG results are not specific for the diagnosis of constrictive pericarditis. On examination of chest X-ray the size of the heart can be normal or enlarged. Echocardiographic examination is very important to establish the diagnosis of constrictive pericarditis (Francis, 2011).

The diagnosis of echocardiography in constrictive pericarditis is based on findings from M-mode echocardiography followed by 2D echocardiography and Doppler hemodynamics in the respiratory cycle response. In constrictive pericarditis, the initial mitral inflow diastolic decreases as inspiration and the isovolumetric relaxation period elongated. While at expiration, the mitral inflow returns to normal and the isovolumetric relaxation retracts. Typical findings of constrictive pericarditis are an increase in the rate of mitral inflow in the early diastolic phase by as much as > 25% during expiration compare with inspiration. The hepatic venous flow from Pulsed Doppler in constrictive pericarditis indicates a significant diastolic flow reversal, which increasing in expiration over inspiration (Dal-Bianco, 2009)

Doppler Pulsed Tissue examination and color Doppler Tissue Imaging (DTI) may help to diagnose constrictive pericarditis. The lateral or septal mitral annular velocity at baseline > 8 cm/s is said to be the boundary value for differentiating patients with

constrictive pericarditis and restrictive cardiomyopathy. This examination is useful when the initial diastolic mitral flow rate change is not (Dal-Bianco, 2009), (Vaitkus, 1996).

In this patients the diagnosis of constrictive pericarditis in addition to anamnesis and physical examination, also obtained from an ECG examination that shows sinus tachycardia and LVH. From the results of chest X-ray obtained cardiomegaly and found the infiltrate in the left lung field. On mantoux test examination was found positive results so that patients are also diagnosed with pulmonary TB. This patient's echocardiographic examination was in accordance with the features of constrictive pericarditis.

Although the main management of constrictive pericarditis is surgery, medical therapy has a role in management at least in three conditions. First, medical therapy for specific causes eg pericarditis due to tuberculosis. Secondly, medical therapy such as anti-inflammatory can treat transient constrictive that occurs in 10-20% of cases within a few months, generally in temporary phenomenon at the time of resolution of pericarditis. Third, medical therapy is a supportive therapy and aims to control congestion symptoms in which surgery is contraindicated or at high risk. Anti-tuberculosis drugs can reduce the risk of 10-80% of occurrence of constrictive pericarditis due to tuberculosis infection (Adler, 2015; Liu, 2009).

In this patient, the therapy given were antibiotics (cefotaxime and gentamicin) and steroids namely prednisone and antituberculosis drug. Patients have not planned for pericardiectomy surgery.

4 CONCLUSIONS

A 21-year-old male patient with a diagnosis of constrictive pericarditis due to pulmonary TB has been reported. The diagnoses were established on the basis of history, physical examination and support of ECG, thoracic X-ray, echocardiography examination, and mantoux test.

Constrictive pericarditis is characterized by diastolic heart filling disorder and an increase in ventricular filling pressure due to rigid pericardium by adhering to the visceral and parietal pericardium. Tuberculosis is a major cause of constrictive pericarditis in developing countries where the incidence of tuberculosis is still high.

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